

# **MECHANISTIC STUDY OF GASTRIC LAVAGE IN ACUTE ORGANOPHOSPHATE POISONING – A PROOF OF CONCEPT STUDY**

## **ABSTRACT**

**INTRODUCTION:** Pesticides are the most common cause for deliberate self harm in developing countries due to easy availability and low cost. It is associated with high mortality. Medical management is difficult and involves immediate resuscitation, gastric decontamination, antidote and supportive care. Gastric lavage is a common procedure used to decontaminate the stomach, though there are not many randomized controlled trials favouring its benefit. Though evidence is sparse, it is still a commonly done procedure; it is the standard of care in India and is a legal requirement. The study aims to measure the amount of organophosphate compound removed from the stomach by gastric lavage, based on the idea that if gastric lavage is effective then the amount of OP will be undetectable at the end of the procedure and a significant amount of OP would have been removed during the lavage process.

**AIM:** To assess the effectiveness of gastric lavage in removing measurable organophosphate from the stomach in patients with acute organophosphate poisoning presenting to a tertiary care centre in South India.

### **OBJECTIVES :**

1. To measure the amount of organophosphate removed from the stomach by gastric lavage.

2. To know the difference in the concentration of OP in the stomach before and after gastric lavage.
3. To find out the number of cycles of gastric lavage required to remove the organophosphate from the stomach.
4. To assess the determinants of the concentration of organophosphate in the stomach at presentation - amount of OP compound consumed, lag time between consumption to gastric lavage and prior decontamination procedures.

**DESIGN:** It is a prospective observational study conducted as a pilot in patients presenting with acute organophosphate poisoning with 6 hours of consumption

**SETTING:** This study was conducted in the Accident and Emergency at Christian Medical College, Vellore by the Department of Medicine

### **STUDY POPULATION:**

#### **Inclusion criteria:**

1. Patients above 18 years of age
2. History of consumption of organophosphate within 6 hours of presentation and who are to undergo gastric lavage

**RESULTS :** 42 Patients were included in this study. OP was identified in 33(78.6%) patients and the majority had received prior medical aid before reaching our centre (73.8%). 88.10% had a good outcome and were discharged alive. Gastric lavage was appropriately done till clearance of smell of OP and till the aspirate was clear. There

were very few complications of the gastric lavage procedure (7.1%). Out of 42 patients who underwent gastric lavage, 8 patients' gastric lavage samples could not be analyzed due to lack of pure standards for performance of HPLC for three compounds. Out of the remaining 34 patients, in majority of them OP compound was detectable in the gastric lavage samples in 24 patients (70.6%) and in 10 patients (29.4%) it was not detectable. None of the hydrophilic compounds that were ingested like monocrotophos and dimethoate were detected in the stomach while nearly all lipophilic OP compounds (88.5%) were detected. OP detected in the stomach at presentation was not dependent on prior gastric lavage (p value 0.321), time to presentation to any hospital after OP consumption (p value 0.822) or time to presentation to our hospital after consumption of OP (p value 0.628). The mean amount of OP removed from the stomach in those with a first gastric aspirate was  $3946.7 \pm 7786.3$  mcg. In patients with first gastric aspirate the mean proportion of OP removed by the first gastric aspirate alone was 79.38%, while in patients without the first aspirate, it was 57.69%. Even after 3 cycle of gastric lavage there were more than 50% of patients who still had detectable OP in the stomach. An estimated <1 % of total OP ingested was removed by gastric lavage. Prior gastric lavage, detection of OP in stomach at presentation or presence of OP in the stomach even after 3 cycles of gastric lavage did not influence the clinical outcomes of patients.

**CONCLUSION:** Gastric lavage is a standard of care in developing countries; however the efficacy of this procedure is not clear. Apart from lipid solubility, no other factors determined the presence of OP in stomach. An average of 4mg of OP was removed by

gastric lavage in those with a gastric aspirate. Gastric lavage did remove OP from the stomach with the maximum (79.38%) being removed by the first gastric aspirate or the first cycle of the gastric lavage. However, it is estimated that <1% of the total OP ingested was removed by gastric lavage. There were no significant differences in the clinical outcome with respect to prior lavage, presence of OP in first gastric aspirate or detectable OP at the end of 3 cycles gastric lavage. Gastric lavage does remove measurable OP from the stomach. It is a safe, easy and cost effective procedure. The amount of OP removed from the stomach is very small when compared to the amount ingested. The study of the mechanism of gastric lavage suggests though the gastric lavage can remove measurable amount of OP from the stomach, the potential clinical benefit of this therapeutic procedure is likely to be low.

**Keywords:** Gastric lavage, OP poisoning, Lipophilic compounds, Efficacy